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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/688,761	10/16/2003	Yasushi Kanai	IIW-034	1977
959	7590	11/27/2006	EXAMINER	
LAHIVE & COCKFIELD, LLP ONE POST OFFICE SQUARE BOSTON, MA 02109-2127			WILLIAMS, SHERMANDA L	
			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 11/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/688,761

Applicant(s)

KANAI ET AL.

Examiner

Shermanda L. Williams

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 17-20 is/are rejected.
- 7) ☒ Claim(s) 8-16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 10/16/03, 04/29/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

The information disclosure statements (IDS) submitted on 10/16/2003 and 4/29/2004 have been considered by the examiner.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is not clear what the applicant means by the phrase "wherein an introduction of agitating gas is controlled in response to an execution of purging from the fuel cell". How is the agitating gas controlled in response an execution of purging? What substance is being purged? The applicant has failed to clearly recite the claimed subject material. The claim does not contain a standard for ascertaining how the agitating gas is controlled in response to an execution of purging from the cell and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 1, 7, and 17 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 10/676,470. Application No. 10/676,470 teaches a hydrogen diluter device with a cathode exhaust pipe having a hole passing through the inside the hydrogen diluter. However, the copending claim 1 does not disclose that the cathode exhaust pipe is located at the upper part of the reservoir. It would have been obvious to one having ordinary skill in the art at the time of the invention to located the cathode exhaust gas pipe at the upper part of the reservoir to ensure proper mixing with the purged hydrogen gas. The conflicting claims are not patentably distinct from each other.
3. Furthermore, it has been held by the courts that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 2, 3, 7, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto et al. (US PG PUB 2003/0077488 A1). Yamamoto et al. US PG PUB 2003/0077488 A1 (herein after Yamamoto '488) teaches a discharged fuel diluter and a dilution-type fuel cell system. The fuel cell uses pure hydrogen as a fuel source aboard an electrically powered vehicle (paragraphs 2 and 34). The cathode and

anode exhaust gases are mixed in a dilution region **10** or reservoir prior to being exhausted to the atmosphere (paragraph 55, Fig. 2). As a result, it is possible to lower the hydrogen concentration of the gas discharged from the outlet of the dilution reservoir to a level lower than a predetermined concentration (for example, 4% by volume i.e. below known explosive levels), and gas at a low hydrogen concentration can be discharged from the fuel cell system. The agitating gas stream to be supplied to the dilution reservoir can be a mixture of cathode exhaust gas exiting the fuel cell and a branched stream of fresh cathode supply gas (controlled by bypass valve 46; see Fig. 2; paragraph 37). As well, the agitating gas stream to be supplied to the dilution reservoir can simply be the cathode exhaust gas. Yamamoto '488 does not explicitly teach that the agitating gas stream is introduced at the upper part of the dilution region or reservoir.

6. However, it has been held by the courts that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70. See MPEP 2144.04. It would have been obvious to one having ordinary skill in the art at the time of the invention to construct an exhaust gas processing device with the agitating gas inlet at the upper part of the reservoir to ensure proper dilution of the purged hydrogen gas.

7. Claims 4, 5, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto et al. (US PG PUB 2003/0077488 A1) as applied to claim 1 above, and further in view of Yamamoto et al. (US PG PUB 2004/0062975 A1). Yamamoto '488 teaches all the limitations of claims 4, 5, and 6 except the cathode exhaust gas pipe having at least one hole passing through the lower part of the reservoir; the pressure in

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the cathode exhaust pipe being lower than the pressure in the reservoir, and that the part of the cathode exhaust pipe that passes through the reservoir having a smaller diameter. Yamamoto et al. US 2004/0062975 A1 (herein after Yamamoto '975) teaches an apparatus for dilution of discharged fuel of a fuel cell. The dilution apparatus comprises a reservoir for collecting purged hydrogen from the fuel cell and a cathode exhaust gas pipe that passes through the reservoir (see abstract).

8. The cathode exhaust gas pipe that passes through the lower part of the reservoir has at least one hole for the mixing of the purged hydrogen and the cathode exhaust gas (paragraph 36; Fig. 3). As stated above in claim 1, the rearranging of parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70.

9. The pressure within the cathode exhaust gas pipe that passes through the reservoir is lower than the internal pressure of the reservoir (paragraph 37). Therefore, the purged hydrogen collected in the reservoir enters the cathode exhaust pipe and is discharged to the surroundings.

10. The cathode exhaust pipe that passes through the lower part of the hydrogen dilution reservoir decreases in diameter as it transverses the hydrogen dilution reservoir (paragraph 12, Fig. 6). The smaller diameter cathode exhaust pipe within the hydrogen dilution reservoir experiences an increased cathode exhaust gas flow and a lower pressure.

11. It would have been obvious to one having ordinary skill in the art at the time of the invention to include a decreasing diameter cathode exhaust pipe passing through the lower part of the hydrogen dilution reservoir of Yamamoto '488 as taught by

Yamamoto '975. This decreases the pressure of the cathode exhaust gas pipe within the hydrogen dilution reservoir and improves the dilution and explosion of the hydrogen gas from the reservoir via the cathode exhaust gas pipe (paragraph 42).

12. Claims 1, 7, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshizumi et al. (US 2002/0094469 A1). Yoshizumi et al. (herein after Yoshizumi '469) teaches a method of discharging hydrogen-off gas from a fuel cell. A method of discharging hydrogen-off gas to the atmosphere according to the following:

a fuel cell is supplied with hydrogen gas and oxidative gas, which generates electric power using the hydrogen gas and the oxidative gas, and discharges hydrogen-off gas and oxygen-off gas that have been consumed. In particular, this method comprises the steps of mixing the hydrogen-off gas discharged from the fuel cell with the discharged oxygen-off gas, and discharging the mixed gases to the atmosphere (Paragraph 12).

The oxygen-off gas and hydrogen-off gas are mixed in the mixing portion **411** or reservoir before being released into atmosphere (Paragraph 12). Yoshizumi '469 does not explicitly state that the location of the agitating gas introduction inlet. However, it has been held by the courts that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70.

13. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshizumi '469 as applied to claim 1 above, and further in view of Blaszczyk et al. (US 6,926,987 B2). Yoshizumi '469 teaches a method of discharging hydrogen-off gas from

a fuel cell. Yoshizumi '469 teaches all the limitations of claims 2 and 3 except the introduction of fresh cathode gas to the hydrogen diluter.

14. Blaszczyk et al (herein after Blaszczyk '987) teaches a fuel cell system and a method of operating the fuel cell system. The fuel cell has as hydrogen and oxygen feed (col. 2 lines 30-39). The anode and/or cathode exhaust gases exiting the fuel cell are fed to a catalytic reactor in the appropriate amount so as to not exceed the limits of inflammability for hydrogen (col. 2 lines 57-64). In one embodiment, part of the fresh cathode gas feed to the fuel cell is diverted around the fuel cell and fed to the catalytic reactor (col. 3 lines 5-14; Fig. 2) as an oxygen or air supply.

15. Yoshizumi '469 does not teach supplying fresh cathode gas to the dilution reservoir. However, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify Yoshizumi '469 in view of Blaszczyk '987 to supply fresh cathode gas to the dilution chamber to ensure the proper amount of oxygen or air is present for diluting the hydrogen. Blaszczyk '987 does not explicitly teach that the cathode exhaust gas enters the catalytic reactor at the upper portion. However, it has been held by the courts that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70.

16. Claims 18, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshizumi et al. (US 2002/0094469 A1) in view of Goto (JP 60-207255 A).

Yoshizumi '469 teaches a method of discharging hydrogen-off gas from a fuel cell by mixing the cathode exhaust gas and the purged hydrogen gas in a hydrogen diluter (paragraph 125). Yoshizumi '469 teaches all the limitations of claims 18, 19, and 20

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except the controller, adjustment valve, and hydrogen concentration detector used to control the amount the agitating gas or cathode exhaust gas amount introduced the hydrogen diluter.

17. Goto JP 60-207255 A (herein after Goto '255) teaches the detecting of the concentration of a gas discharged from the fuel cell and controlling the amount of gas supply according to the detected value. A hydrogen concentration detector monitors the hydrogen content of the gas discharged from the fuel cell. The hydrogen concentration detector then provides an input to the controller that controls the amount of fuel gas supplied to the fuel cell via a flow control valve or adjustment valve. The amount of fuel gas may be increased or decreased depending on the input the controller receives from the hydrogen concentration detector. See Abstract. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the hydrogen diluter system of Yoshizumi '469 to include a controller, adjustment valve, and hydrogen concentration detector such as taught by Goto '255 in order to monitor and respond to hydrogen concentration levels in the discharge stream leaving the hydrogen diluter.

18. With respect to Claim 19, the hydrogen concentration detector controls the flow of cathode exhaust based on the hydrogen level detected in the hydrogen diluter discharge. The cathode exhaust is increased or decreased depending on the input provided to the controller from the hydrogen concentration detector. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the hydrogen diluter system of Yoshizumi '469 to include a controller, adjustment

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valve, and hydrogen concentration detector such as taught by Goto '255 in order to monitor and adjust (increase or decrease) the amount of cathode exhaust gas provided to the hydrogen diluter if the hydrogen concentration level in the discharge stream is higher than the predetermined acceptable limit. The purpose of adjusting the amount of cathode exhaust gas provided to the hydrogen diluter is to ensure the hydrogen content of the discharge stream exiting the hydrogen diluter is a safe (nonflammable) level.

19. With respect to claim 20, the execution of purging from the fuel is interpreted to mean the hydrogen content of the discharge exiting the hydrogen diluter. As discussed above, the amount of agitating gas or cathode exhaust gas introduced to the hydrogen diluter is dependent upon the hydrogen level detected by the hydrogen concentration detector.

Allowable Subject Matter

20. Claims 8-16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

21. The following is a statement of reasons for the indication of allowable subject matter: In Claim 8 the applicant claims a exhaust gas process device for a fuel cell wherein the agitating gas is cathode exhaust gas supplied from a pipe branched off the primary cathode exhaust discharge (the cathode exhaust gas enters the diluter a two separate entry points). None of the references applied above teaches or suggest this subject matter. The closes prior art Yoshizumi et al. (US 2002/0094469 A1) teaches

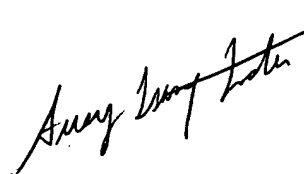
supplying only one cathode exhaust process stream to the hydrogen diluter for diluting the purged hydrogen.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shermanda L. Williams whose telephone number is (571) 272-8915. The examiner can normally be reached on Mon.-Thurs. 7 AM - 4:30 PM and alternating Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

 SUSYTSANG-FOSTER
PRIMARY EXAMINER